Amrita School of Engineering, Bengaluru Campus, Amrita Vishwa Vidyapeetham
19PHY104: Computational Engineering Mechanics-1
Topic: Forces and Moments on a Point
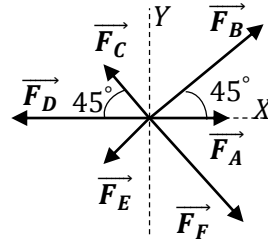**Maximum Marks: 10 (all questions carry 2.5 marks each)**

1. Define Newton's Laws of Motion (3 of them). Draw diagrams where required.	3. Resolve the following six forces along the Cartesian coordinate axes. Smaller forces have magnitude equal to *Roll*. Larger forces have 2* *Roll*. Find the resultant force.
2. A slab with equilateral triangle as its face (with length = *Roll*, i.e., your roll number and thickness = *Roll* units) weighs *Roll* N. Three cables from the vertices of the top-triangle are suspended from a point, *Roll* units above the centroid of the slab. Determine the tension in the cables.	4. Consider a cuboid of dimension 2* *Roll*, 4* *Roll* and 6* *Roll* along the X, Y and Z axes, respectively. It is centred at the origin (O). The bottom face has vertices as A, B, C and D. The top face has vertices P, Q, R and S, such that P is above A, and so on. Considering $\overrightarrow{AP}$ as $\overrightarrow{F_1}$, determine the moment about O. Considering $\overrightarrow{AR}$ as $\overrightarrow{F_2}$, determine the moment about O.